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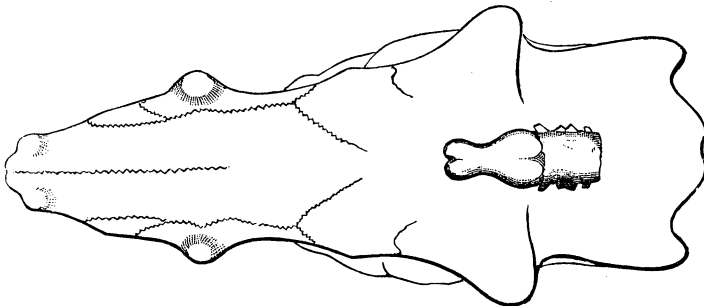
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domestic customs. The author favors the view of Mr. Park Harrison and Professor Owen that migrations to America proceeded by the Sandwich and Easter Islands as well as by Behring Strait. He concludes by affirming that "the whole of the phenomena of man in America represent an arrested development of civilization, cut short, as compared with Europe and Asia, at a time so remote that in the Old World the great religions of the globe, Judaism, Christianity, and Islam, had time to cover the Eastern hemisphere, while until the Spanish conquest the Americas had in the flux of centuries never heard their revelations." — O. T. MASON.

### GEOLOGY AND PALÆONTOLOGY.

THE BRAIN OF THE DINOCERAS. — This extinct animal, discovered by Professor Marsh in the Eocene beds of Wyoming, nearly equaled the elephant in size, but the limbs were shorter. The head could reach the ground, and there is no evidence that it carried a proboscis. Professor Marsh figures the skull in his second memoir, entitled *Principal Characters of the Dinocerata* (*American Journal of Science*, February, 1876).



(FIG. 9.) SKULL OF DINOCERAS, SHOWING RELATIVE SIZE OF THE BRAIN.

The accompanying cut (Fig. 9) gives an outline of the skull (seen from above, one eighth the natural size) of *Dinoceras mirabile*. The central figure near the base of the skull illustrates the remarkably small brain. Says Professor Marsh, "The brain-cavity in *Dinoceras* is perhaps the most remarkable feature in this remarkable genus. It proves conclusively that the brain was proportionately smaller than in any other known mammal, recent or fossil, and even less than in some reptiles. It was, in fact, the most reptilian brain in any known mammal. In *D. mirabile* the entire brain was actually so diminutive that it could apparently have been drawn through the neural canal of all the presacral vertebræ, certainly through the cervicals and lumbaræ."

MOUNTAIN-MAKING. — An abstract of Professor Suess's memoir on the Origin of the Alps has been furnished the *American Journal of Science* by Mr. E. S. Dana, which we further condense, often using the exact language of the abstract. According to the views of the early geol-

ogists, still widely accepted, the origin of mountains is to be ascribed to the elevation of a molten or semi-molten mass which threw up the rocks along its axis, and crowded the upper strata to the right and left, forming in this way a mountain-chain. But this view is not sustained by observed facts, and Suess adopts the modern view of a general horizontal movement of the mountain system as a whole. The conclusions of Suess agree to a very considerable extent with those of Professor Dana in his discussion of mountain-making in general.

In the Alps the exertion of this horizontal force was essentially influenced by resistance from four different sources: (1) from the presence of foreign masses of older rocks; (2) from the folding mass itself; (3) from the occasional introduction of older volcanic rocks, as granite and porphyry, in the moving mass; (4) finally, it appears that single mountain masses, like the Adamello or the red porphyry, near Botzen, have exerted an essential influence on the development of the surrounding mountain region.

If we look at the subject more broadly, however, and pass out of Europe to America, and then further study the great mountain-chains of Asia, we arrive at this grand conclusion: throughout, mountain-masses and mountain-movements are *one-sided*, and the direction of the movement is in general northwest, north, or northeast, in North America and Europe, but southerly or southeasterly in Central Asia. There is no regular geometrical arrangement in mountain-chains.

In conclusion, it may be remarked that mountain-making as a whole can be regarded as a stiffening of the earth's surface, which process has been determined by the distribution of certain older rigid masses. These may be made up of mountain lines pushed up together and crossing each other, as in Bohemia, or they may consist of widely extended surfaces whose strata, even the oldest, have retained their horizontal position, as in the great Russian plain. These primitive masses conform to no geometrical law, either in outline or in distribution, though they have determined the form and course of the folds which contraction has produced in the more pliant portions of the earth's surface between them.

## GEOGRAPHY AND EXPLORATION.

EXPLORATION OF THE UPPER MADEIRA PLATE. — Professor James Orton, of Vassar College, is preparing for a third expedition to South America. He purposes to explore the unknown parts of the Upper Madeira Plate, the Rio Beni in particular. This magnificent river, the largest tributary to the Madeira, has never been explored; its course is as much a geographical problem as the source of the Nile. The mysterious Madre de Dios is supposed to be an affluent, but it remains to be proved. Lieutenant Gibbon was charged by our government to settle the question, but he failed in the attempt. Professor Orton intends to examine this river mainly in the interest of geographical science; but